Application No. 09/551,256
Amendment dated August 25, 2003
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group 2877

Listing of Claims:

Claims 1 and 3-31 are pending. Claim 3 is being amended.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously presented) A method of monitoring input light having a plurality of spectral bands, the method comprising:

during a first time interval,

separating a first spectral band of the plurality of spectral bands from the plurality of spectral bands,

directing the first spectral band to a photodetector while preventing the spectral bands in the plurality of spectral bands other than the first spectral band from reaching the photodetector,

generating a first power signal representing combined optical power of the spectral bands other than the first spectral band, and

generating, with a wavelength-monitoring circuit that is coupled to the photodetector, a first signal representing a quality characteristic of a modulated or unmodulated pattern of light in the first spectral band; and

thereafter, during a second time interval,

separating a second spectral band of the plurality of spectral bands from the plurality of spectral bands,

directing the second spectral band to the photodetector while preventing spectral bands in the plurality of spectral bands other than the second spectral band from reaching the photodetector, and

generating, with the wavelength-monitoring circuit, a second signal representing the quality characteristic of the modulated or unmodulated pattern of light in the second spectral band.

2. (Canceled).

3. (Currently amended) A method of monitoring input light having a plurality of spectral bands, the method comprising:

during each of a plurality of successive time intervals corresponding to the plurality of spectral bands,

separating ~~each~~ a different corresponding spectral band of the plurality of spectral bands from the plurality of spectral bands,

directing the separated spectral band to the photodetector while preventing the spectral bands other than the separated spectral band from reaching the photodetector, and

generating, with the wavelength-monitoring circuit, a signal representing a quality characteristic of a modulated or unmodulated pattern of light in the separated spectral band, the quality characteristic being one or more of signal-to-noise ratio, bit error rate, specific bytes in SONET frames, and optical wavelength center frequency.

4. (Original) The method of claim 1, wherein the first and second signals represent, for the first and second spectral bands, one or more of signal-to-noise ratio, bit error rate, optical power level, and optical wavelength center frequency.

5. (Original) The method of claim 1, wherein:

the modulation pattern implements SONET STS-1 frames; and

the first and second signals represent specific bytes in the SONET frames.

6. (Previously presented) Apparatus for monitoring input light having a plurality of spectral bands, the apparatus comprising:

an optical train that intercepts the input light and provides optical paths for routing the spectral bands;

a photodetector;

a routing mechanism that operates to direct selected spectral bands to said photodetector;

an electrical circuit coupled to said photodetector to provide a signal representing a quality characteristic of a modulated or unmodulated pattern of light impinging on said

photodetector, the quality characteristic being one or more of signal-to-noise ratio, bit error rate, specific bytes in SONET frames, and optical wavelength center frequency; and

a control circuit coupled to said routing mechanism to cause only a first selected spectral band to be directed to said photodetector during a first time interval and to cause only a second selected spectral band to be directed to said photodetector during a second time interval, whereby said electrical circuit provides, during said first and second intervals, respective first and second signals representing the quality characteristic for the first and second selected spectral bands.

7. (Previously presented) The apparatus of claim 6, and further comprising:

an additional photodetector; and

an additional electrical circuit that provides a signal representing optical power of those spectral bands other than the selected spectral band.

8. (Previously presented) Apparatus for monitoring input light having a plurality of spectral bands, the apparatus comprising:

an optical train that intercepts input light and provides optical paths for routing the spectral bands, wherein said input light is subject to a modulation pattern that implements SONET STS-1 frames;

a photodetector;

a routing mechanism that operates to direct selected spectral bands to said photodetector;

an electrical circuit, coupled to said photodetector, that provides a signal representing specific bytes in the SONET frames of said modulated pattern of light impinging on said photodetector; and

a control circuit coupled to said routing mechanism to cause only a first selected spectral band to be directed to said photodetector during a first time interval and to cause only a second selected spectral band to be directed to said photodetector during a second time interval, whereby said electrical circuit provides, during said first and second intervals, respective first and second signals representing specific bytes in the SONET frames for the first and second selected spectral bands.

9. (Original) The apparatus of claim 6, wherein

said control circuit sequentially causes said routing mechanism to select each of the plurality of spectral bands so that the plurality of spectral bands are sequentially communicated to said photodetector in a round-robin fashion.

10. (Previously presented) Apparatus for monitoring input light having a plurality of spectral bands, the apparatus comprising:

an optical train that intercepts the input light and provides optical paths for routing the spectral bands;

a photodetector;

a routing mechanism that includes a plurality of dynamically configurable routing elements corresponding to the plurality of spectral bands, each routing element having first and second states, said first state causing that routing element to direct its respective spectral band to said photodetector, said second state causing that routing element to direct its respective spectral band so as not to reach said photodetector; and

an electrical circuit coupled to said photodetector to provide a signal representing a quality characteristic of a modulated or unmodulated pattern of light impinging on said photodetector; and

a control circuit coupled to said routing mechanism to cause only a first selected spectral band to be directed to said photodetector during a first time interval and to cause only a second selected spectral band to be directed to said photodetector during a second time interval, whereby said electrical circuit provides, during said first and second intervals, respective first and second signals representing the quality characteristic for the first and second selected spectral bands, wherein

said control circuit sequentially selects each routing element in a desired subset of the plurality of routing elements so that the corresponding subset of spectral bands are sequentially communicated to said photodetector in a round-robin fashion, whereupon the spectral bands in said subset of spectral bands are monitored for quality by said electrical circuit and spectral bands not in said subset are not monitored for quality by said electrical circuit.

11. (Original) The apparatus of claim 10, wherein:

said second state of each of said routing elements causes that routing element to direct its respective spectral band to a common location.

12. (Original) The apparatus of claim 11, and further comprising an additional photodetector that generates a signal representing optical power of light impinging on said common location.

13. (Original) The apparatus of claim 6, wherein said optical train includes a dispersive element.

14. (Original) The apparatus of claim 10, wherein at least one of said dynamically configurable elements is a rooftop prism whose position can be changed to define said first and second states.

15. (Original) The apparatus of claim 10, wherein at least one of said dynamically configurable elements includes a mirror whose orientation can be changed to define said first and second states.

16. (Original) The apparatus of claim 12, further comprising an additional electrical circuit that is connected to said additional photodetector and computes the total optical power incident on said additional photodetector and sets a threshold for triggering a fault condition if said optical power falls below said threshold.

17. (Previously presented) A system for monitoring light having a plurality of spectral bands and traveling along an optical fiber, the system comprising:

a wavelength monitor;

a coupler that directs a fraction of light traveling on said fiber to said wavelength monitor;

said wavelength monitor including:

an optical train that intercepts light directed to said wavelength monitor by said coupler and provides optical paths for routing the spectral bands;

a photodetector;

a routing mechanism that operates to direct selected spectral bands to said photodetector;

an electrical circuit coupled to said photodetector to provide a signal representing a quality characteristic of a modulated or unmodulated pattern of light impinging on said photodetector; and

a control circuit coupled to said routing mechanism to cause only a first selected spectral band to be directed to said photodetector during a first time interval and to cause only a second selected spectral band to be directed to said photodetector during a second time interval, whereby said electrical circuit provides, during said first and second intervals, respective first and second signals representing the quality characteristic for the first and second selected spectral bands; and

a management processor that receives information based on said signal representing a quality characteristic.

18. (Previously presented) Apparatus for monitoring at least one characteristic of input light having a plurality of spectral bands, the apparatus comprising:

an optical train that intercepts the input light and provides optical paths for routing the spectral bands;

first and second photodetectors;

a plurality of dynamically configurable routing elements corresponding to the plurality of spectral bands, each routing element having first and second states, said first state causing that routing element to direct its respective spectral band to said first photodetector, said second state causing that routing element to direct its respective spectral band to said second photodetector;

a first electrical circuit coupled to said first photodetector to provide a signal representing a quality characteristic of a modulated or unmodulated pattern of light impinging on said first photodetector;

a second electrical circuit coupled to said second photodetector to provide a signal representing optical power of light impinging on said second photodetector; and

a control circuit coupled to said routing elements operating

(a) to cause, during a first time interval, a first selected one of said routing elements corresponding to a first selected spectral band to assume said first state while causing the routing elements other than said first routing element to assume said second state; and

(b) to cause, during a second time interval, a second selected one of said routing elements corresponding to a second selected spectral band to assume said first state while causing the routing elements other than said second routing element to assume said second state;

whereby

said first electrical circuit provides, during said first and second intervals, respective first and second quality characteristic signals representing the quality characteristic for said first and second selected spectral bands, and

said second electrical circuit provides, during said first interval, a first optical power signal representing the optical power of the spectral bands other than said first selected spectral band, and during the second interval, a second optical power signal representing the optical power for the spectral bands other than said second selected spectral bands.

19. (Original) The apparatus of claim 18, wherein said first electrical circuit provides a signal representing, for each selected spectral band, one or more of signal-to-noise ratio, bit error rate, optical power level, and optical wavelength center frequency.

20. (Original) The apparatus of claim 18, wherein said control circuit sequentially selects each routing element in the plurality of routing elements so that the plurality of spectral bands are sequentially communicated to said first photodetector in a round-robin fashion.

21. (Original) The apparatus of claim 18, wherein said control circuit sequentially selects each routing element in a desired subset of the plurality of routing elements so that the corresponding subset of spectral bands are sequentially communicated to said first photodetector in a round-robin fashion, whereupon said subset of spectral bands are monitored

for quality by said first electrical circuit and spectral bands not in said subset are not monitored for quality by said first electrical circuit.

22. (Original) The apparatus of claim 18, wherein said first photodetector is a PIN photodiode or an avalanche photodiode.

23. (Original) The apparatus of claim 18, wherein said optical train includes a dispersive element.

24. (Original) The apparatus of claim 18, wherein at least one of said dynamically configurable elements is a rooftop prism whose position can be changed to define said first and second states.

25. (Original) The apparatus of claim 18, wherein each of said dynamically configurable elements includes a mirror whose orientation can be changed to define said first and second states.

26. (Original) The apparatus of claim 18, wherein said second electrical circuit connected to said second photodetector computes the total optical power incident on said photodetector and sets a threshold for triggering a fault condition if said optical power falls below said threshold.

27. (Original) The apparatus of claim 20, in a system that further includes:

a coupler that directs a fraction of light traveling on a fiber to be monitored to said optical train; and

a management processor that receives information based on said signal representing a quality characteristic.

28. (Previously presented) A method of monitoring light having a plurality of spectral bands and traveling along an optical fiber, the method comprising:

using a coupler to direct a fraction of light traveling along the fiber away from the fiber, and, with respect to the light directed away from the fiber:

during a first time interval,

separating a first spectral band of the plurality of spectral bands from the plurality of spectral bands,

directing the first spectral band to a photodetector while preventing the spectral bands in the plurality of spectral bands other than the first spectral band from reaching the photodetector, and

generating, with a wavelength-monitoring circuit that is coupled to the photodetector, a first signal representing a quality characteristic of a modulated or unmodulated pattern of light in the first spectral band; and

thereafter, during a second time interval,

separating a second spectral band of the plurality of spectral bands from the plurality of spectral bands,

directing the second spectral band to the photodetector while preventing spectral bands in the plurality of spectral bands other than the second spectral band from reaching the photodetector, and

generating, with the wavelength-monitoring circuit, a second signal representing a quality characteristic of a modulated or unmodulated pattern of light in the second spectral band; and

providing the information based on the first and second signals representing a quality characteristic to a management processor.

29. (Previously presented) The method of claim 28, and further comprising, during the first time interval, generating a first power signal representing combined optical power of the spectral bands other than the first spectral band.

30. (Previously presented) A method of monitoring input light having a plurality of spectral bands, the method comprising:

during a first time interval,

separating a first spectral band of the plurality of spectral bands from the plurality of spectral bands,

directing the first spectral band to a photodetector while preventing the spectral bands in the plurality of spectral bands other than the first spectral band from reaching the photodetector, and

generating, with a wavelength-monitoring circuit that is coupled to the photodetector, a first signal representing a quality characteristic of a modulated or unmodulated pattern of light in the first spectral band, the quality characteristic being one or more of signal-to-noise ratio, bit error rate, and optical wavelength center frequency; and

thereafter, during a second time interval,

separating a second spectral band of the plurality of spectral bands from the plurality of spectral bands,

directing the second spectral band to the photodetector while preventing spectral bands in the plurality of spectral bands other than the second spectral band from reaching the photodetector, and

generating, with the wavelength-monitoring circuit, a second signal representing the quality characteristic of the modulated or unmodulated pattern of light in the second spectral band.

31. (Previously presented) The method of claim 30, and further comprising, during the first time interval, generating a first power signal representing combined optical power of the spectral bands other than the first spectral band.